Postnatal amniotic fluid intake reduces gut inflammatory responses and necrotizing enterocolitis in preterm neonates - DTU Orbit (03/10/2019)

Postnatal amniotic fluid intake reduces gut inflammatory responses and necrotizing enterocolitis in preterm neonates

Preterm neonates are susceptible to gastrointestinal disorders such as necrotizing enterocolitis (NEC). Maternal milk and colostrum protects against NEC via growth promoting, immunomodulatory, and antimicrobial factors. The fetal enteral diet amniotic fluid (AF), contains similar components, and we hypothesized that postnatal AF administration reduces inflammatory responses and NEC in preterm neonates. Preterm pigs (92% gestation) were delivered by caesarean section and fed parental nutrition (2 days) followed by enteral (2 days) porcine colostrum (COLOS, n = 7), infant formula (FORM, n = 13), or AF supplied before and after introduction of formula (AF, n = 10) in experiment 1, and supplied only during the enteral feeding period in experiment 2 (FORM, n = 16; AF, n = 14). The NEC score was reduced in both AF and COLOS pigs, relative to FORM, when AF was provided prior to full enteral feeding (9.9 and 7.7 compared with 17.3, P <0.05). There was no effect of AF when provided only during enteral feeding. AF pigs showed decreased bacterial abundance in colon and intestinal inflammation-related genes (e.g., TNF-α, IL-1α, IL-6, NOS) were downregulated, relative to FORM pigs with NEC. Anti-inflammatory properties of AF were supported by delayed maturation and decreased TNF-α production in murine dendritic cells, as well as increased proliferation and migration, and downregulation of IL-6 expression in intestinal cells (IEC-6, IPEC-J2). Like colostrum, AF may reduce NEC development in preterm neonates by suppressing the proinflammatory responses to enteral formula feeding and gut colonization when provided before the onset of NEC.

General information
Publication status: Published
Organisations: National Veterinary Institute, Section for Immunology and Vaccinology, Center for Biological Sequence Analysis, Department of Systems Biology, Section for Bacteriology, Pathology and Parasitology, Aarhus University, University of Copenhagen
Contributors: Siggers, J., Østergaard, M. V., Siggers, R. H., Skovgaard, K., Melbak, L., Thymann, T., Schmidt, M., Møller, H. K., Purup, S., Fink, L. N., Frikiær, H., Boye, M., Sangild, P. T., Bering, S. B.
Pages: G864-G875
Publication date: 2013
Peer-reviewed: Yes

Publication information
Journal: American Journal of Physiology: Gastrointestinal and Liver Physiology
Volume: 304
Issue number: 10
ISSN (Print): 0193-1857
Ratings:
BFI (2013): BFI-level 1
Scopus rating (2013): CiteScore 4.14 SJR 2.202 SNIP 1.228
Web of Science (2013): Impact factor 3.737
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
Original language: English
DOIs: 10.1152/ajpgi.00278.2012
Source: dtu
Source ID: n:oai:DTIC-ART:highwire/386709110::28538
Research output: Contribution to journal › Journal article – Annual report year: 2013 › Research › peer-review